7. For strains on centre girder $k$ to $g$.

$k \times 121.34 = l$

$W = 121.34 \times 2 = 243.55$

$W \times 121.34 = 400$ tons strain at $j$.

And at any point $x$ feet from $j$,

\[
\frac{W}{2} \times \left( \frac{l}{2} - x \right) \times \left( \frac{l}{2} + x \right) = \text{strain at that point.}
\]

$W = \frac{303.36}{121.34} = 2.5087$ (as before) = $C$

\[
\left( \frac{l}{2} - x \right) \times \left( \frac{l}{2} + x \right) = (60.67 - 3) \times (60.67 + 5)
\]

<table>
<thead>
<tr>
<th>Sec. area (tension)</th>
<th>Sec. area (compression)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(sq. in.)</td>
<td>(sq. in.)</td>
</tr>
<tr>
<td>26.6 x 135.6 x $C = 235$</td>
<td>100 x 120</td>
</tr>
<tr>
<td>21.6 x 141.6 x $n = 332$</td>
<td></td>
</tr>
<tr>
<td>16.6 x 146.6 x $n = 264$</td>
<td></td>
</tr>
<tr>
<td>11.6 x 151.6 x $n = 191$</td>
<td></td>
</tr>
<tr>
<td>6.6 x 156.6 x $n = 112$</td>
<td></td>
</tr>
</tbody>
</table>

8. For strains on cantilever $c$ to $B, l = 41.6$.

$W = \left( \frac{Ae + cB}{2} \right) \times 2 = \frac{AB}{2} \times 2 = \frac{AB}{2} \times 2 = 240$ tons.

Then we have

\[
W = \frac{240 \times 41.6}{11.5} = 868 \text{ tons strain at } B,
\]

and

\[
\frac{240}{11.5} = 20.87 = c, \text{ whence}
\]

<table>
<thead>
<tr>
<th>Sec. area (tension)</th>
<th>Sec. area (compression)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(sq. in.)</td>
<td>(sq. in.)</td>
</tr>
<tr>
<td>$c \times 56.6 = 765$</td>
<td>150 sq. in. 100 sq. in.</td>
</tr>
<tr>
<td>$c \times 51.6 = 555$</td>
<td>125 $''$ 160 $''$</td>
</tr>
<tr>
<td>$c \times 22.6 = 456$</td>
<td>125 $''$ 125 $''$</td>
</tr>
<tr>
<td>$c \times 6.6 = 157$</td>
<td>90 $''$ 125 $''$</td>
</tr>
</tbody>
</table>

9. For strains on cantilever $B$ to $k$ we have $l = 53.2$.

$W = \left( \frac{R \times 2\ell}{2} \right) + \left( \frac{(BC - 2\ell) \times 2\ell}{2} \right) = 173.5$

\[
\frac{173.5 \times 53.2}{11.5} = 803 \text{ tons strain at } B,
\]

and

\[
\frac{173.5}{11.5} = 15.087 = e
\]

The sectional areas given in the above tables are the net quantities of iron in the top and bottom members of each girder as it now stands. The plates used average about 12 ft. in length, and vary from $\frac{1}{2}$ in. to $\frac{3}{4}$ in. in thickness. Fig. 5 shows an enlarged arrangement of joints and cover plates in tension.

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**BRIDGE OVER THE RIVER THAMES AT COOKHAM.**

**PLATE V.**

The bridge over the Thames, at Cookham, is remarkable, not for its size, nor for difficulties attending its erection, but for the cheapness with which it was constructed. When the Cookham Bridge Company decided on the construction of the new bridge, the directors advertised for designs, and in return thirty-seven plans and estimates were sent in, these estimates varying from 1900L. to 27,000L. ! The tender accepted was that of Messrs. Pease, Hutchinson, and Co., of the Skerne Ironworks, Darlington, and 32, Coleman-street, London, whose estimate was 2520L.; and premiums were awarded for the two next best designs, those of Messrs. Peto and Co. and Mr. John Pinchbeck, of London.

The bridge, of which we give a perspective view on Plate V,, is 335 ft. long over all, while its length between abutments is 300 ft. The clear width of the roadway is 20 ft., and the height of the bridge at the centre, from the bed of the river to the top of the hand-rail,